

# Agilent 6210 TOF LC/MS System

## Quick Start Guide

Use this guide for your first steps with the Agilent 6210 LC/MS TOF System, and as a roadmap for your user information.

### What is the Agilent 6210 TOF LC/MS system?

The Agilent TOF is an orthogonal-axis time-of-flight mass spectrometer (oa-TOF). That is, the ions reaching the time-of-flight chamber are impelled in a direction perpendicular to their original path.

You can set up an Agilent time-of-flight mass spectrometer system (TOF) in several configurations:

ESI – Electrospray Ionization  
APCI – Atmospheric Pressure  
Chemical Ionization  
APPI – Atmospheric Pressure  
Photo Ionization  
MALDI – Matrix-Assisted Laser  
Desorption Ionization  
MMI - Multimode Ionization

- For normal flow LC/MS with a binary pump, quaternary pump, well-plate sampler (or autosampler) and ESI, APCI, APPI or MMI ion sources
- For microflow LC/MS with a capillary pump, micro well-plate sampler and ESI, APCI or MMI ion source
- For nanoflow LC/MS with a nanopump, micro well-plate sampler and nanospray source or dual nanospray source
- TOF system with an AP-MALDI source

Each Agilent system has advantages for drug discovery – high throughput sample screening with highly sensitive detection and accurate mass assignment.

Each system uses the same Agilent MassHunter Software to enable these advantages, although the AP-MALDI TOF system uses only the TOF portion of the software.



**Agilent Technologies**

You use the Agilent MassHunter Software for setting up and running data acquisition. For data analysis, you have two choices. You can use the PE Sciex Analyst QS 1.1 software package which Agilent provides which is especially modified for the Agilent 6210 LC/MS TOF system.

You can also use the Agilent MassHunter Workstation Qualitative Analysis program and the Agilent MassHunter Workstation Quantitative Analysis program. Both of these programs are included. Before using either of these programs, you need to translate your data files from the WIFF format to the format used by these Agilent programs using the Translator program. You can run this program interactively or directly from a worklist. The translator program is included in the Agilent MassHunter Workstation Qualitative Analysis program's installation.

## **What's New in A.02.02**

Agilent MassHunter Software has many new features in this revision.

- Priming of the flush pump for WPS is now supported.
- Seal Wash for Pumps is now supported.
- Minimum Carryover Reduction for WPS is now supported.
- G1315D DAD is now supported.
- G1329B ALS is now supported.
- Device Reorder Utility is now available.
- WIFF files can be translated when running a Data Analysis method into the data format used by the Agilent MassHunter Workstation Qualitative Analysis program and the Agilent MassHunter Workstation Quantitative Analysis program. Both Analyst and Agilent MassHunter Workstation Qualitative Analysis programs must be installed for this feature to work.
- Saturation limit has been removed from both the EFC and Mass List reports.

This guide is valid for A.02.xx revisions of the Agilent 6210 MassHunter Software, where xx refers to minor revisions of the software that do not affect the technical accuracy of this guide.

## Where to find information

### Online Help

**Press F1** To get more information about a pane or dialog box, place the cursor on the part of the pane or dialog box of interest and press **F1**.

**Help menu** From the Help menu, access “How-to” help and reference help.

**PE-Sciex Analyst online help** Refer to Analyst online help to learn how to view, quantitate and report on Agilent 6210 LC/MS TOF results.

### Documents

You can find these manuals delivered with the TOF hardware or software. You can also find a PDF version on the installation CD-ROM, in the **Manuals** folder.

**TOF User’s Guide** Use this guide to install and set up the TOF hardware. This guide also contains background information to help you operate, maintain and troubleshoot the TOF.

**6210 LC/MS TOF System Installation Guide** This guide is used by the Agilent customer engineer to install the 6210 LC/MS TOF hardware and MassHunter Software, configure the instrument, and verify performance.

You can find these manuals on the installation CD-ROM, in the **Manuals** folder.

**Concepts Guide - The Big Picture** Learn the background information to help you make selections in the software.

**Familiarization Guide** Do the exercises to learn to use the MassHunter Software.

### Training

**Familiarization Guide** Use this guide as a training lab.

**Training Courses** Visit [www.chem.agilent.com](http://www.chem.agilent.com) to view a listing of training courses for the Agilent 6210 LC/MS TOF system.

# Instructional overview

## 1 Install the TOF hardware

Use the *Agilent G1969 LC/MSD TOF User's Guide* to install the hardware.

## 2 Install the software

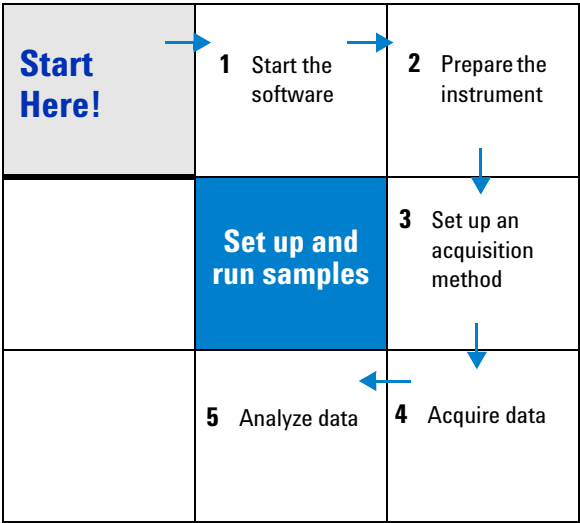
Use the instructions in the *Agilent 6210 Time-of-Flight LC/MS System Installation Guide* to install both the MassHunter Software and the Analyst software. The sequence in which you install the software is listed below:

- a Install Analyst QS 1.1.
- b Install the Agilent MassHunter Software.
- c Configure the instrument for the first time.
- d Start the software and verify performance.

## 3 Set up and run samples

The roadmap below shows you the steps to set up and run a sample from start to finish. Follow the instructions on the next pages to get started and to learn where to find the information to help you with each step in this roadmap.

Read the  
Concepts Guide  
for background on  
these steps.



## Step 1—Start the software

The instructions below include the following assumptions:

- The hardware and software are installed.
- The instrument is configured.

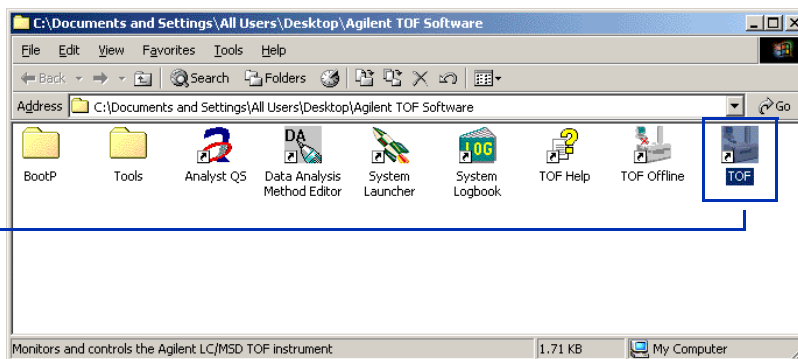
Use instructions in the *Installation Guide* to configure the instrument for the first time.

- The LC modules and the TOF are turned on, but the pump is not running.

### Start software/check configuration

- 1 Double-click the Agilent TOF group on your desktop.

- 2 Double-click the TOF icon to start the software engines.

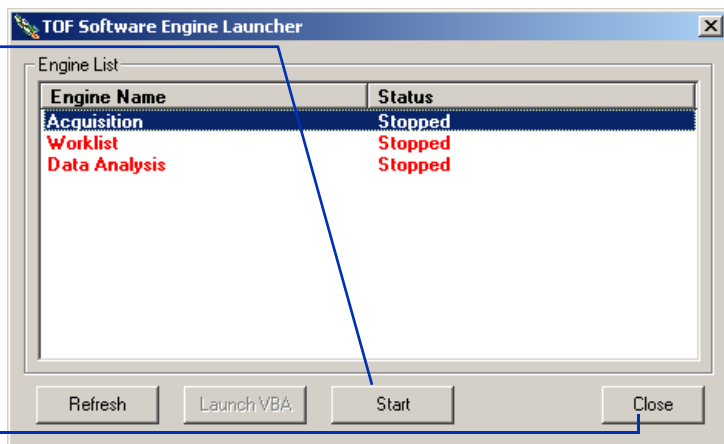


**Figure 1** Agilent TOF group window

3 Click Start.

4 When all of the engines say "Running", click Close.

5 Double-click the TOF icon in the Agilent TOF group (Figure 1).

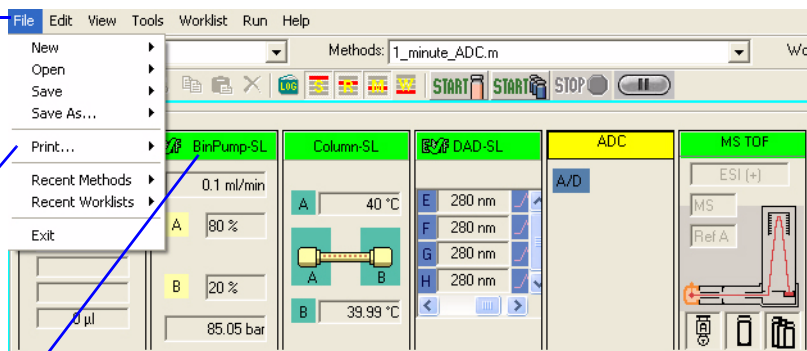


The main window appears. See Figure 2 on page 7. The top pane of this window is the Instrument Status pane. (Figure below)

6 Make sure that the LC modules are the ones that you want configured with the instrument. (See below.)

• Select File > Print > Instrument Configuration, OR

• Check the headers of the LC modules labeled in the Instrument Status pane.



If LC modules other than those you intend to use appear in the Instrument Status pane or the Configuration report, use the Online Help to access instructions to *reconfigure* the instrument.

## Four panes—where you do most of your work

When you first start the MassHunter Software, the main window appears. You do almost all of your work within the four panes of this main window. These panes provide the tools to set up acquisition methods, run samples interactively or automatically, monitor instrument status and monitor runs.

Click a button to see the pane you want to use.

Instrument Status pane

Real-time Plot pane

Method pane

Worklist pane

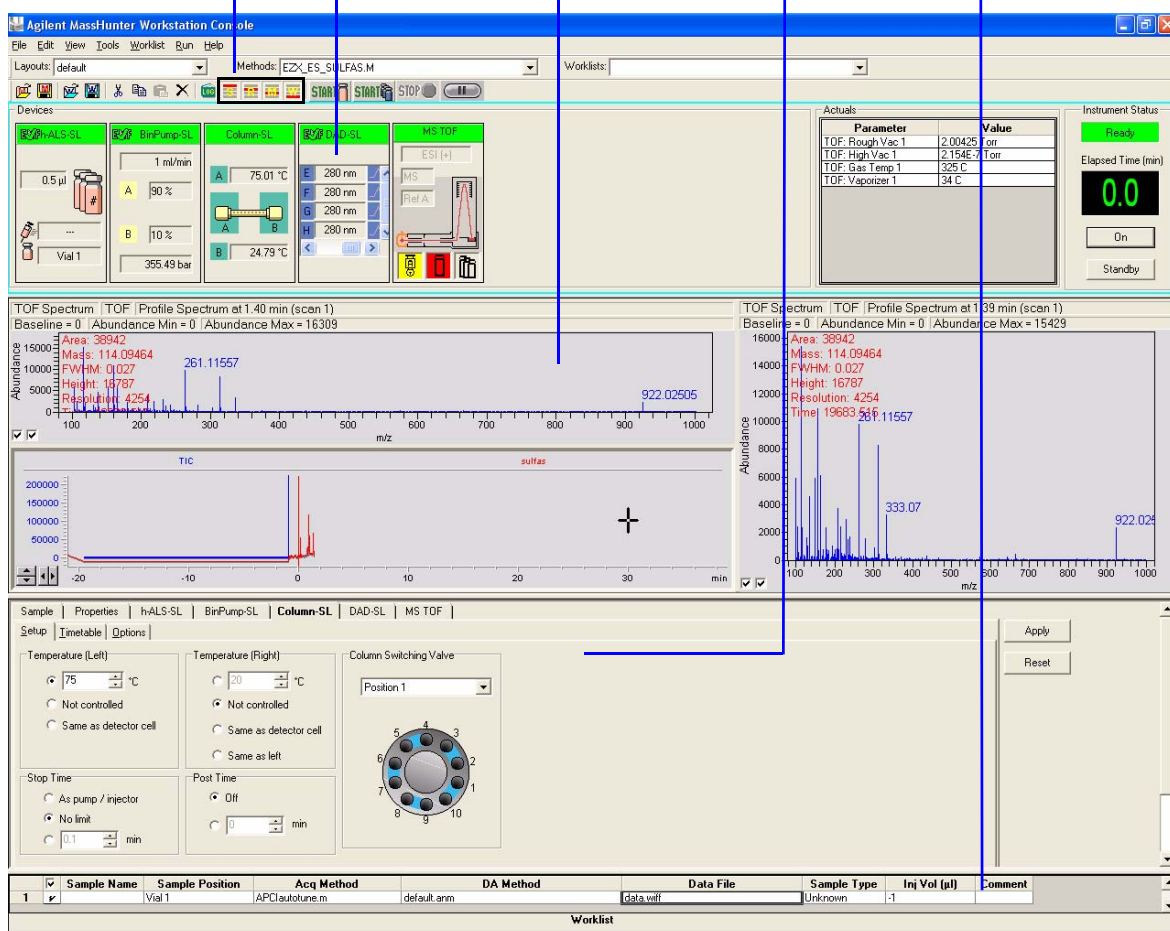


Figure 2 Main window of the TOF application

## Show/hide the panes

You can show one pane at a time on the screen or up to four panes. You can never hide all four panes. To show or hide a pane, you click on the icons in the main window toolbar.

When you click on a pane, the active pane is outlined in blue. Press F1 to obtain help on the active pane. You can also drag a pane border to resize the pane.

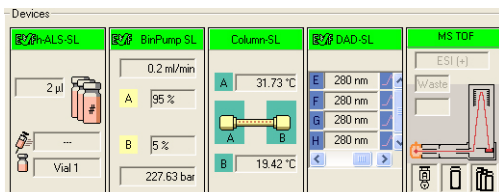


**S**—Instrument Status; **R**—Real-time Plot  
**M**—Method; **W**—Worklist

## Instrument Status pane

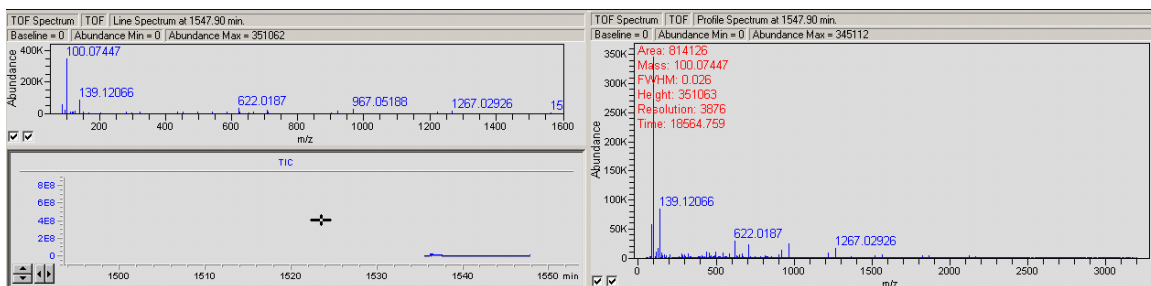
You may have several different LC modules in your LC stack, for example, both a well-plate sampler and micro well-plate sampler. With this pane you can make sure that the correct LC module is configured.

You also set non-method control and configuration parameters for the LC devices and TOF and monitor the status of the device parameters during a run.



## Real-time Plot pane

With this pane you monitor the plot of chromatograms and spectra in real time.





## Method pane

With this pane you enter instrument settings for acquisition methods and sample information to run individual samples interactively.

Sample | Properties | **MS TOF**

Ion Source: ESI

Ion Polarity (Seg.): ☒ Positive ☐ Negative

☐ Disable Screen Updates

Time and Scan Segments

Time (minutes): 0.00

Scans: 1

Buttons: Add, Del, Mod

Stop Time: ☒ No Limit / As Pump ☒ StopTime 5.00 Minutes

Data Storage (Seg.): ☐ None ☒ Profile ☐ Centroid

LC Stream (Seg.): ☐ MS ☒ Waste

Abs. Centroid Threshold: 5000 counts

Rel. Centroid Threshold: 0.01 % counts

Data Acquire (Seg.)

Mass Range: 50 To 3200 m/z

Cycles/Sec: 00.89 Scans/Sec: 00.89 Transients/Scan: 10000

Approximate Maximum Mass: 3600

Length of Transients: 104992

## Worklist pane

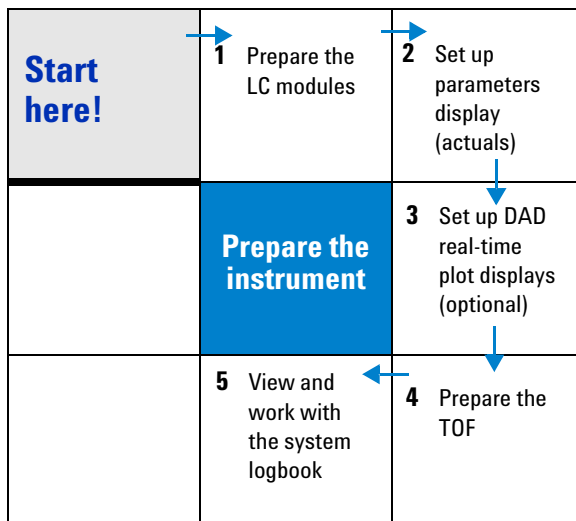
With this pane you enter sample information for individual samples and information for batch samples. When you run the worklist, the samples and batches are automatically run in the order listed in the worklist.

File Edit View Tools Worklist Run Help									
Layouts: default			Methods: ESIautotune.m			Worklists: t1.wkl			
<div></div>									
	<input checked="" type="checkbox"/>	Sample Name	Sample Position	Acq Method	DA Method	Data File	Sample Type	Inj Vol (µl)	Comment
1	<input checked="" type="checkbox"/>	Vial 1		default.m	default.anm	data1.wkl	Unknown	-1	

## Step 2—Prepare the instrument

Read and follow the steps in the user information listed below to learn how to prepare the instrument for a run.

- The steps on the next pages that take you through the roadmap below.
- Chapter 2 of the *Concepts Guide*, Instrument Preparation, for background information that you may need to prepare the 6210 LC/MS TOF.
- Chapter 1, Prepare the instrument, in the *Familiarization Guide* to learn to prepare the LC and TOF to run an ESDemo sample.
- *Online Help* under Master Task List, LC Startup and TOF optimization and calibration.



## Prepare LC modules

### Switch LC stream to Waste

While you purge the LC pump and condition or equilibrate the column, you can tune and calibrate the TOF. During this time you do not want effluent streaming into the TOF.

If you specify that the LC stream goes to Waste and not to the TOF, the stream passes through the DAD. You can then monitor the fluctuations of the DAD real-time chromatogram and spectra before a run.

- 1 Click the **Method pane** icon to view the Method pane.

The screenshot shows the 'MS TOF' tab in the 'Method pane'. The 'Data' sub-tab is selected. The 'Ion Source' is set to 'ESI'. The 'Ion Polarity (Seg.)' is set to 'Positive'. The 'Stop Time' is set to '5.00' minutes. The 'Data Storage (Seg.)' is set to 'Profile'. The 'LC Stream (Seg.)' is set to 'Waste'. The 'Abs. Centroid Threshold' is set to '5000' counts. The 'Rel. Centroid Threshold' is set to '0.01' % counts. The 'Approximate Maximum Mass' is set to '3600'. The 'Mass Range' is set to '50' to '3200' m/z. The 'Cycles/Sec' is set to '00.89'. The 'Scans/Sec' is set to '00.89'. The 'Transients/Scan' is set to '10000'. The 'Length of Transients' is set to '104992'.

**Figure 3** Data tab of the MS-TOF tab in the Method pane

- 2 Click the **MS-TOF** tab of the Method pane.
- 3 Click the **Data** tab within the MS-TOF tab.
- 4 Select **Waste** if not already selected.
- 5 Click **Apply**.

## Purge the LC pump

**Purge the binary pump** You purge the binary pump manually.

- 1 Right-click the binary pump status box in the Instrument Status pane.

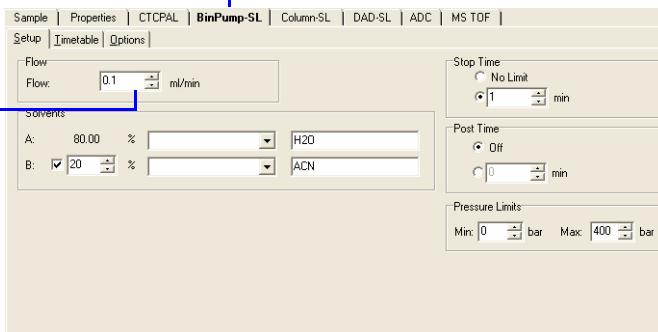
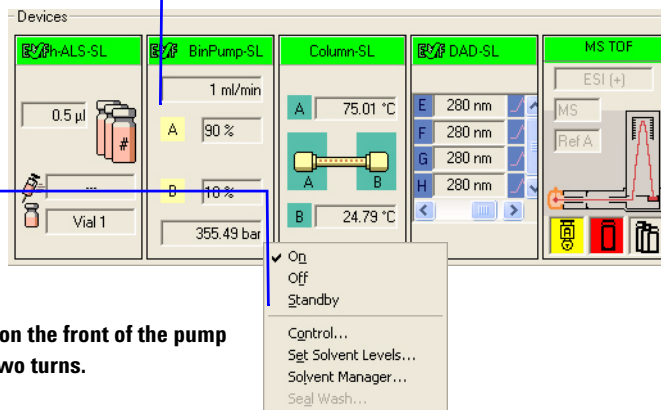
- 2 Select Standby in the shortcut menu.

- 3 Turn the black valve on the front of the pump counter-clockwise two turns.

- 4 Click the Bin Pump tab in the Method pane.

- 5 Enter a Flow of 5 ml/min, and click Apply.

- 6 Select On in the binary pump shortcut menu.



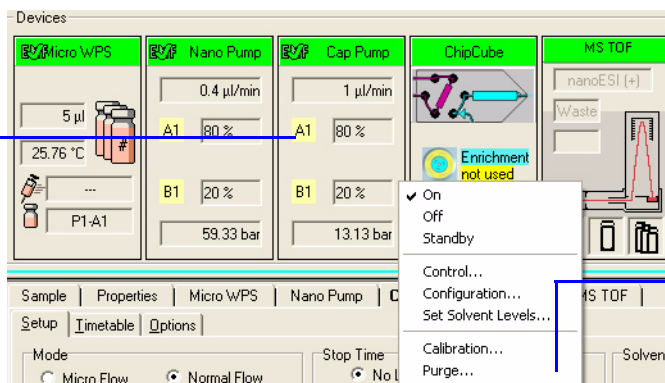
- 7 After purging, enter the flow you use to equilibrate the column, and click Apply.

- 8 Close the black valve.

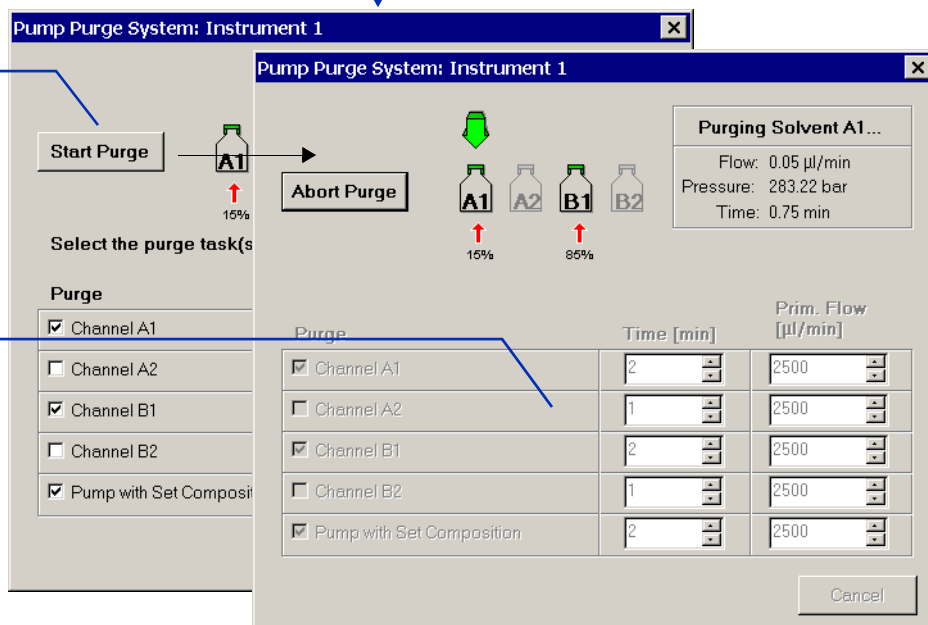
Purge for about 9 minutes to pass about 45 mL or 3X the volume for the binary pump.

## Purge the capillary or nano pump

- 1 Right-click pump device in the Instrument Status pane to bring up pump device menu.
- 2 Select Purge to bring up the Pump Purge System dialog box.



- 3 Start the purge with this dialog box and bring up the monitoring dialog box.



- 4 Monitor the purge with this dialog box and click Cancel after the purge is complete.

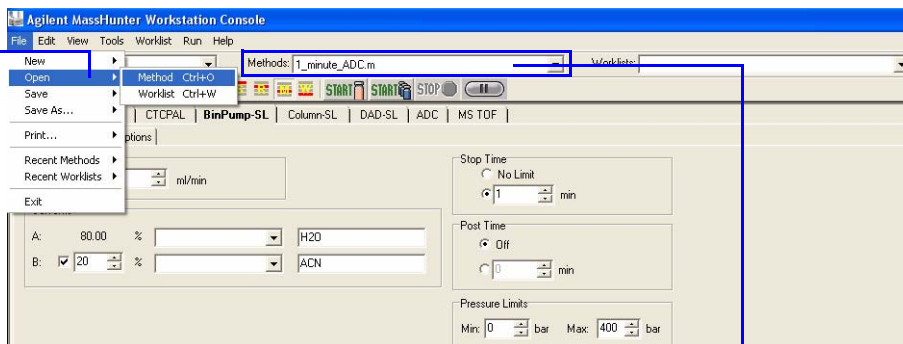
## Condition or equilibrate the column

After you purge the pump, you set up to condition or equilibrate the column.

- Enter and download LC parameters, OR open a conditioning method.
- Change any non-method control parameters, if necessary.
- Monitor the baseline and adjust the plot to make sure the column is equilibrated and the baseline stable. (See “Set up to view real-time parameter values (actuals)” on page 16 and “Set up DAD chromatographic and spectral displays (optional)” on page 17.)

## Enter and download LC parameters or open a conditioning method

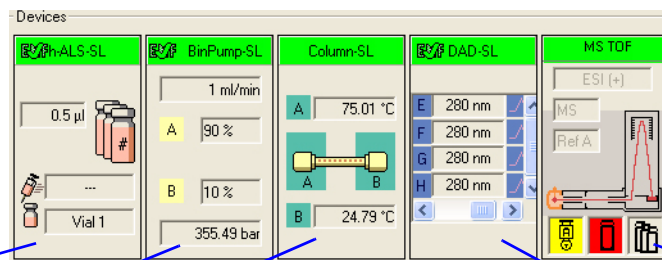
- 1 Select Open from the File menu to open a method, OR enter LC parameters in the Method pane.
- 2 Click Apply to send the parameters to the LC.



You can also load a method using the Methods selection box in the Combo bar.

**Change non-method control/configuration parameters, if necessary.** With these menus, you can set the time to automatically turn the module on or off, you can set maximum values or you can configure the autosampler.

**Right-click the LC module in the Instrument Status pane to bring up the control menu for that module.**



- Configuration...
- ☒ Tray Illumination On/Off
- Reset Injector
- Move Home
- Needle Up
- Valve Bypass
- Injector Flush Pump...

- ☒ On
- Off
- Standby
- Control...
- Set Solvent Levels...
- Solvent Manager...
- Segl Wash...

- Control...
- Columns...
- ☒ Thermostat Controlling On

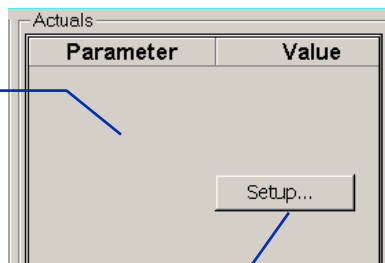
- ☒ UV Lamp On
- Vis Lamp On
- Control...
- Calibration...
- Balance
- Intensity Plot...

- ☒ On
- Standby
- Off
- Vent
- Pump Down
- APPI UV Lamp
- TOF Settings Report...

## Set up to view real-time parameter values (actuals)

As you prepare for a run and during a run, you want to see the actual values of the instrument parameters. You can do this in the Instrument Status pane.

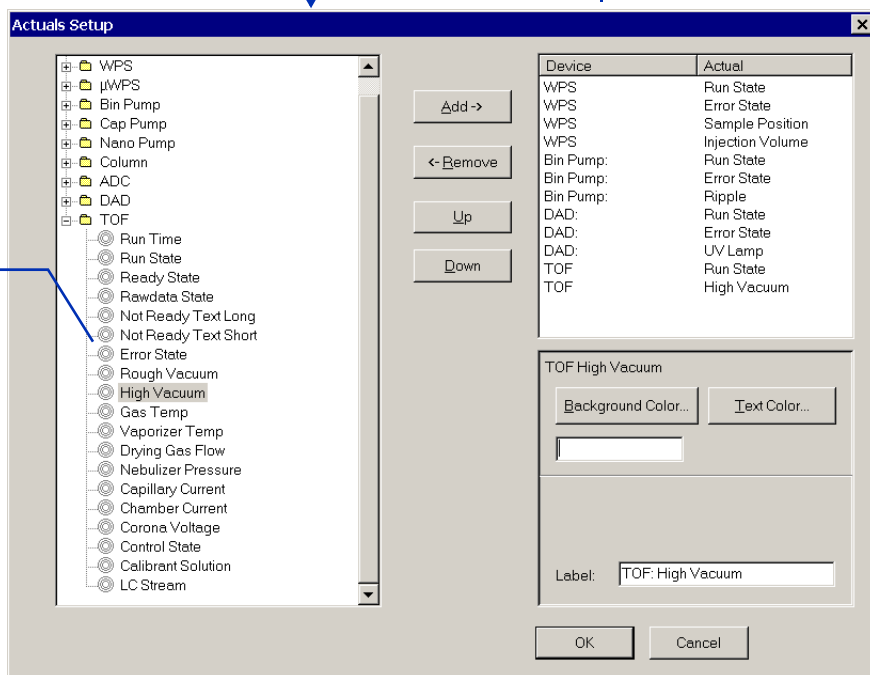
- 1 Right-click the Actuals box to bring up Setup item.



- 2 Click Setup to bring up the tool to select instrument actuals.

Parameter	Value
WPS: Run State	pre-run
WPS: Error State	No
WPS: Sample Position	Vial 1
WPS: Injection Volume	5
Bin Pump: Run State	pre-run
Bin Pump: Error State	No
Bin Pump: Ripple	-0.14 %
DAD: Run State	pre-run
DAD: Error State	No
DAD: UV Lamp	Lamp on
TOF: Run State	pre-run
TOF: High Vacuum	0.0e+00 milli

- 3 Select actuals to set up to view the actual conditions in the Instrument Status pane.



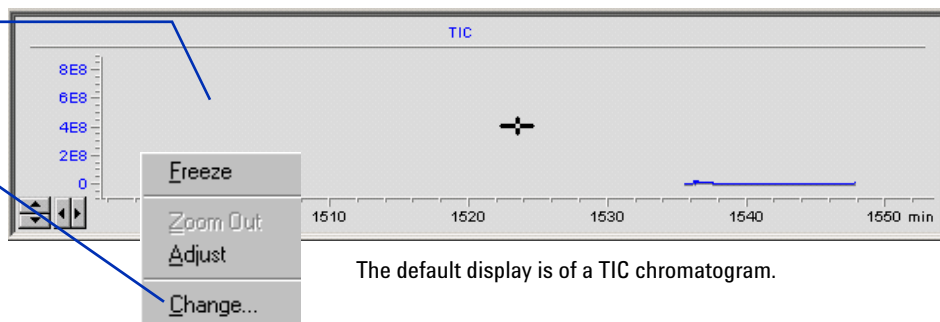


## Set up DAD chromatographic and spectral displays (optional)

As you condition the column, you set up the displays to monitor the effluent.

### Set up chromatographic display

- 1 Right-click the signal plot to bring up the signal shortcut menu.
- 2 Select Change to bring up the tool for selecting the signal and its plot parameters.



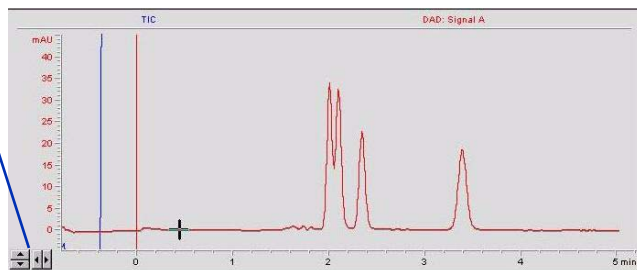
The default display is of a TIC chromatogram.

- 3 Select a DAD signal that you intend to monitor, and click Add.
- 4 Highlight a Selected Signal.
- 5 Set the y and x axis ranges, and click OK.

The 'Edit Signal Plot' dialog box is shown. It has two main sections: 'Available Signals' and 'Selected Signals'. In 'Available Signals', the list includes 'DAD: Signal C', 'DAD: Signal D', 'DAD: Signal E', 'Column Thermostat: Temperature c', 'Column Thermostat: Temperature c', and 'Test TIC'. In 'Selected Signals', 'DAD: Signal A' is listed. Below these are 'Add->' and '<- Remove' buttons. Under 'Select one signal', there are two radio buttons: 'Predictable Range' (selected) and 'Floating Range'. The 'Predictable Range' section has 'From:' (0) and 'To:' (100) input fields. The 'Floating Range' section has 'Y-axis range:' (10000000000) and 'Offset:' (50) input fields, with a percentage symbol next to the offset. There is also an 'Auto y-adjust' checkbox. At the bottom, there is a 'Window Properties' section with an 'X-axis range:' (60) input field and a 'min' unit label, and a 'Draw Grid' checkbox. 'OK', 'Cancel', and 'Apply' buttons are at the bottom right. Blue arrows point from the instructions to the 'Add' button, the 'Selected Signals' list, and the 'Y-axis range' and 'X-axis range' input fields.

The real-time plot now displays the DAD signal. (See next page.)

Adjust the plot with these arrows.



## Set up spectral display

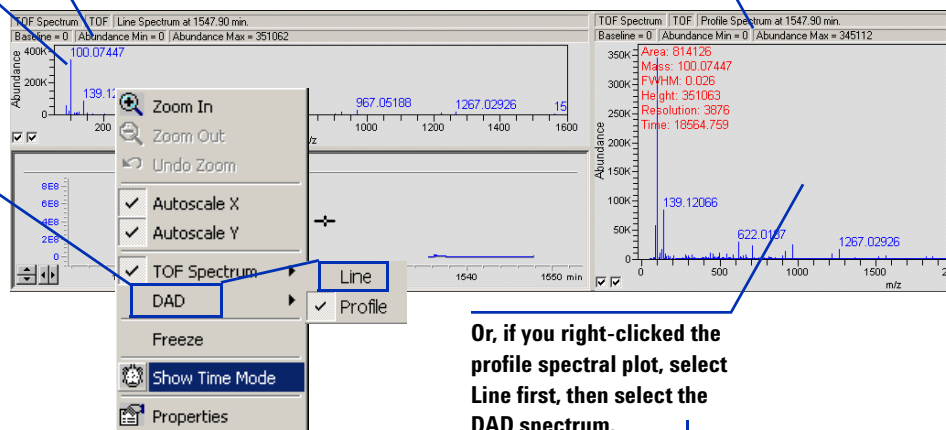
The default spectral display is a TOF line spectrum above the chromatogram and a profile spectrum to the right of the chromatogram.

Line spectrum

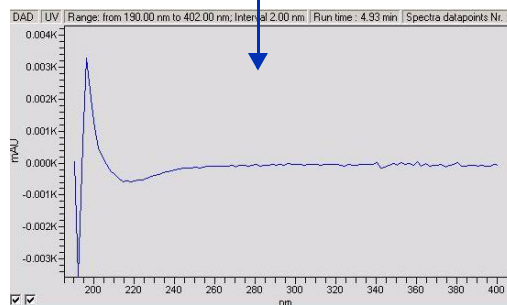
Profile spectrum

- 1 Right-click the line or profile spectral plot to bring up the spectra shortcut menu.

- 2 If you clicked the line spectral plot, select the DAD spectrum as the spectrum to view.



Or, if you right-clicked the profile spectral plot, select Line first, then select the DAD spectrum.



## Prepare the TOF

### Calibrate the TOF

You calibrate the TOF more frequently than you tune the TOF. Agilent recommends that you do a 10 mass calibration. Make sure that you open the method corresponding to your ion source before you calibrate or tune the TOF to set default TOF acquisition parameters.

- ESIautotune.m for ESI
- nanoESIautotune.m for nanospray or dual nanospray
- APPIautotune.m for APPI
- APCIautotune.m for APCI
- MMIAutotune.m for MMI

You cannot calibrate the TOF with a MALDI source installed.

If the method loaded does not match the current ion source, then a warning is given.

### Polarity Switching

If you are using Polarity Switching, you need to use a different autotune method. For each source, there is a positive and a negative method for Polarity Switching. The name of the autotune method has either “PolaritySWPos” or “PolaritySWNeg” appended to it.

- ESIautotunePolaritySWPos.m for ESI
- ESIautotunePolaritySWNeg.m for ESI
- nanoESIautotunePolaritySWPos.m for nanospray or dual nanospray
- nanoESIautotunePolaritySWNeg.m for nanospray or dual nanospray
- APPIautotunePolaritySWPos.m for APPI
- APPIautotunePolaritySWNeg.m for APPI
- APCIautotunePolaritySWPos.m for APCI
- APCIautotunePolaritySWNeg.m for APCI
- MMIAutotunePolaritySWPos.m for MMI
- MMIAutotunePolaritySWNeg.m for MMI

You will need to perform four autotunes to correctly tune the TOF system when using Polarity Switching. First, you need to tune in both positive and negative modes. Then, you need to tune using the Polarity Switching methods in both positive and negative modes.

## Check and do a tune

- 1 Click the **MSTOF** tab in the **Method** pane and select ion polarity.

- 2 Enter calibration parameters.

When you click Calibrate, the valve to Calibration solution A opens.

- 3 Click **Calibrate** if you have already chosen the ten masses.

- 4 Click to make sure that the calibration is satisfactory.

- 5 If you want to select a different set of masses or you want to use a different calibration standard, click **Show Extended**.

- 6 Select masses to use for calibration, OR load another mass list.

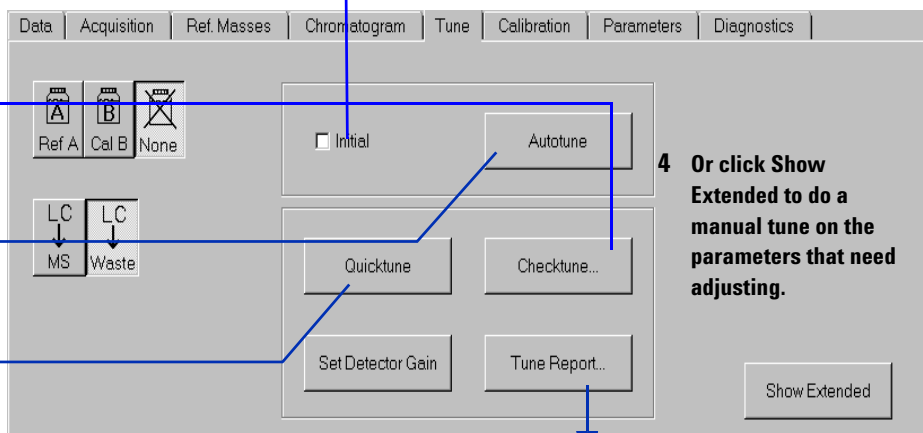
- 7 Then calibrate again.

- 1 Click the Tune tab under the MSTOF tab.

You do an initial autotune after repair or installation.

- 2 Check to see if the TOF needs tuning.

- 3 Click Autotune for a tune that takes 15-20 minutes or Quicktune for a tune that takes 1-3 minutes.

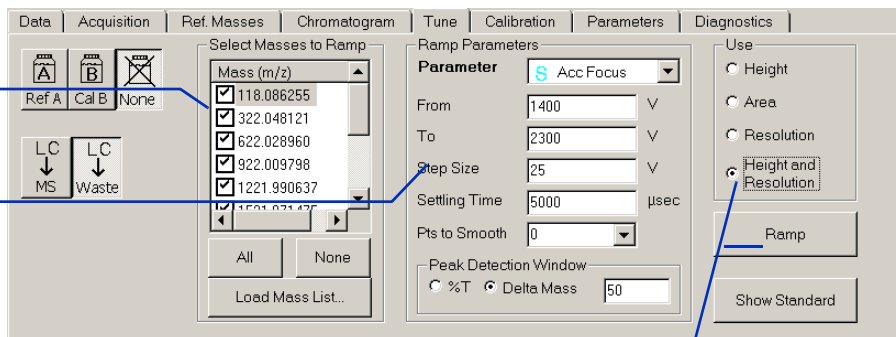


- 4 Or click Show Extended to do a manual tune on the parameters that need adjusting.

- 1 Select the masses for the ramp.

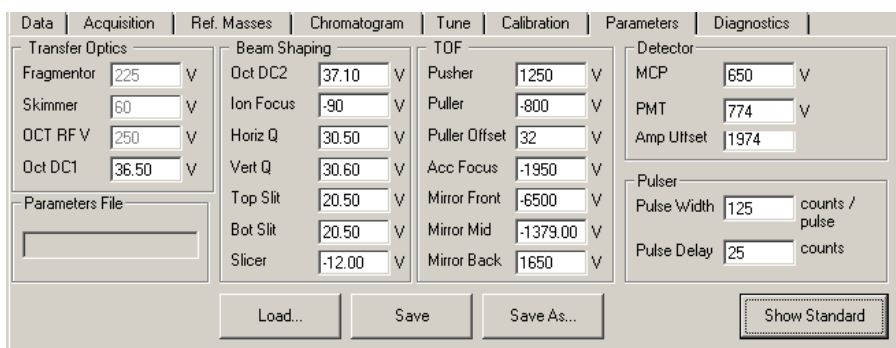
- 2 Select the parameter to vary.

- 3 Select the variable to optimize, and click Ramp.



If you do a manual tune, you must also do a calibration. Autotune and Quicktune include mass calibration with one mass.

After you do a tune, the optimized parameters appear in the Parameters panel.



## Switch LC stream to MS

After you condition the column and calibrate and tune the TOF, you switch the LC stream from Waste to MS.

- 1 Click the **Method pane** icon to view the Method pane.

The screenshot shows the 'Data' tab of the MS-TOF method pane. It features several configuration sections: 'Stop Time' with radio buttons for 'No Limit / As Pump' (selected) and 'StopTime' (1.00 minutes); 'Data Storage (Seg.)' with radio buttons for 'None', 'Profile' (selected), and 'Centroid'; 'LC Stream (Seg.)' with radio buttons for 'MS' (selected) and 'Waste'; 'Data Acquire (Seg.)' with 'Mass Range' (200 to 350 m/z), 'Cycles/Sec' (00.89), 'Scans/Sec' (00.89), and 'Transients/Scan' (10000); and threshold settings for 'Abs. Centroid Threshold' (5000 counts) and 'Rel. Centroid Threshold' (0.01 % counts). On the right, 'Approximate Maximum Mass' is set to 'Custom', 'Custom Maximum Mass' is 3571.00, and 'Length of Transients' is 104992.

**Figure 4** Data tab of the MS-TOF tab in the Method pane

- 2 Click the **MS-TOF** tab of the Method pane.
- 3 Click the **Data** tab within the MS-TOF tab.
- 4 Select **MS** in the LC Stream (Seg.) section.
- 5 Click **Apply**.

## Monitor TOF baseline and spectral displays

If you did not monitor the LC baseline with a DAD, skip this module. Make sure that the TOF baseline is stable and no spectra of interfering intensity appear in the display.

If you did monitor the LC baseline with a DAD, follow these steps.

- 1 Right-click the chromatogram display.
- 2 Select **Change**.
- 3 Highlight the TIC signal in the list of **Selected Signals**.
- 4 Set the **x** and **y axis** ranges.
- 5 Click **OK**.
- 6 Right-click the spectral displays.
- 7 Select **TOF spectra >Line** or **Profile**.
- 8 Monitor the baseline and spectra.

## View the system logbook for events and errors

As you prepare the instrument, you may run into an error that you want to troubleshoot. You do this through the System Logbook Viewer.

**Select System Logbook Viewer from the Tools menu.**

**OR, click the Log icon.**

**Select Columns**

**Find**

**Filter Events**

**Click icon to find or filter an event, or to show or hide a column.**

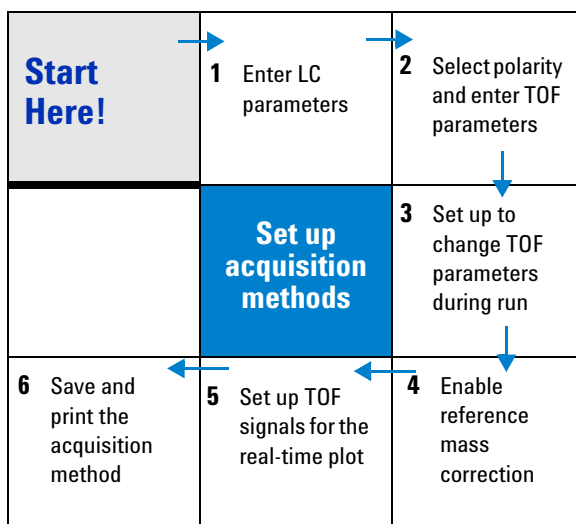
**Export the logbook to print the logbook.**

Time	EventSource	Category	Description
04/09/2003 01:39:04 PM	Worklist	Hide Column	Sample Equilibration Time (mins) = 0.000000
04/09/2003 01:39:04 PM	Worklist	Show All Columns	Sample Injection Volume (µl) = -1.000000
04/09/2003 01:39:04 PM	Worklist	Columns...	Sample Data File Name = C:\PE Sciex Data\Projects\Example\Data\esdemoeetes
04/09/2003 01:39:04 PM	Worklist	Column Width...	Sample Data Analysis Method =
04/09/2003 01:39:04 PM	Worklist	Sort by Event	Sample Acquisition Method =
04/09/2003 01:39:04 PM	Worklist	Sort	Sample Position = Vial 3
04/09/2003 01:39:04 PM	Worklist	Filter...	Sample Name = esdemoeetest1
04/09/2003 01:39:04 PM	Worklist	Find...	Sample Identifier =
04/09/2003 01:39:04 PM	Worklist	Export...	Acquisition Run Started for Sample
04/09/2003 01:39:04 PM	Worklist		Interactive Sample Run Started
04/09/2003 01:39:04 PM	Worklist		Interactive Sample Run Complete
04/09/2003 01:39:04 PM	Worklist		Acquisition Run Complete for Sample
04/09/2003 01:39:04 PM	Worklist		Sample Run successfully completed.
04/09/2003 01:39:04 PM	Worklist		Instrument 1 Data acquisition completed
04/09/2003 01:39:04 PM	Worklist		Instrument 1 Run completed
04/09/2003 01:39:04 PM	Worklist		G1316A_1 (US54000249) Right temperature at end of run: 20.01 deg. C
04/09/2003 01:39:04 PM	Worklist		G1316A_1 (US54000249) Left temperature at end of run: 20.40 deg. C
04/09/2003 01:39:04 PM	Worklist		G1376A_1 (DE00000000) Pressure at end of run: 177.94 bar
04/09/2003 01:39:04 PM	Worklist		G1377A_1 (PP00000050) Injected from Vial 3
04/09/2003 01:39:04 PM	Worklist		Instrument 1 Collecting data
04/09/2003 01:39:04 PM	Worklist		G1316A_1 (US54000249) Right temperature at start of run: 19.97 deg. C
04/09/2003 01:39:04 PM	Worklist		G1316A_1 (US54000249) Left temperature at start of run: 20.36 deg. C
04/09/2003 01:39:04 PM	Worklist		G1376A_1 (DE00000000) Pressure at start of run: 172.22 bar
04/09/2003 01:39:04 PM	Worklist		Instrument 1 Injection
04/09/2003 01:39:04 PM	Worklist		Instrument 1 Run started
04/09/2003 01:39:04 PM	Worklist		Sample Description = Description
04/09/2003 01:39:04 PM	Worklist		Sample Equilibration Time (mins) = 0.000000
04/09/2003 01:39:04 PM	Worklist		Sample Injection Volume (µl) = -1.000000
04/09/2003 01:39:04 PM	Worklist		Sample Data File Name = C:\PE Sciex Data\Projects\Example\Data\etest3.wiff
04/09/2003 01:39:04 PM	Worklist		Sample Data Analysis Method =
04/09/2003 01:39:04 PM	Worklist		Sample Acquisition Method =
04/09/2003 01:39:04 PM	Worklist		Sample Position = Vial 3
04/09/2003 01:39:04 PM	Worklist		Sample Name = etest3
04/09/2003 01:39:04 PM	Worklist		Sample Identifier =
04/09/2003 01:39:04 PM	Worklist		Acquisition Run Started for Sample
04/09/2003 01:39:04 PM	Worklist		Interactive Sample Run Started
04/09/2003 01:39:04 PM	Worklist		Interactive Sample Run Complete
04/09/2003 01:39:04 PM	Worklist		Error in Running Interactive Sample
04/09/2003 01:39:04 PM	Worklist		Error in Storing Sample Information in the Data File
04/09/2003 01:39:04 PM	Worklist		Error in Creating Data File "C:\PE Sciex Data\Projects\Example\Data\etest3.wiff".
04/09/2003 01:39:04 PM	Worklist		File could be Locked or the Path is Not Valid. Try to stop and restart Analyst Service

## Step 3—Set up acquisition methods

Read and follow the steps in the user information listed below to learn how to set up methods.

- The steps on the next pages that take you through the roadmap below.
- Chapter 3 of the *Concepts Guide*, Acquisition Methods, to learn background information to help you set up methods.
- Exercise 2, Set up an Acquisition Method, in the *Familiarization Guide*
- *Online Help* for the tasks that correspond to the roadmap steps and the tasks listed on the next pages.





## Enter LC parameter values

You can also enter pre-run/post-run scripts in the Properties tab.

Enter LC parameters in the LC module tabs.

If you click Apply, the parameters are sent to the instrument but are NOT saved to the method.

Do not modify scripts provided by Agilent because these scripts may be overwritten the next time you upgrade the Agilent software.

## Enter TOF parameter values

1 Select ion polarity.

2 Enter TOF parameters in the Data, and Acquisition tabs.

You enter these values for the initial time 0.0 min and the whole run and for one scan, unless you add other time segments and scans. See the next page.

Right-click each field to find the maximum and minimum values.

All entries in the Tune, Calibration and Parameters tabs are not saved with the method.

## Set up to change TOF parameters with segments and scans

- 1 For the initial run time of 0.0 and 1 scan, enter TOF values.

- 2 Enter the next time for which you want to change segment values and click Add.

- 3 Add up to four scans for each time segment, including the initial time.

- 4 For each scan, change a value or values.

The screenshot shows the 'Data' tab in the software interface. The 'ESI (Seg.)' section has a table with columns 'Time (minutes)' and 'Scans'. The 'MS TOF (Scan)' section has a table with columns 'Scan' and 'Value'. Blue boxes highlight the 'Add' button in the 'ESI (Seg.)' table and the 'MS TOF (Scan)' table. Blue lines connect the numbered instructions to these elements.

ESI (Seg.)		MS TOF (Scan)	
Time (minutes)	Scans	Scan	Value
0.00	1	1	225
0.00		2	60
		3	250

You can also change values on the Data tab for each time segment.

Note that Ion Polarity can be changed for each time segment. The label for that section will be "Ion Polarity (Seg.)" if there are more than one time segments.

Note the values you can change with each time segment.

Note the values you can change with each scan.

## Enable reference mass correction

You enable for mass correction during a run to obtain the specified mass accuracy.

### Set up for mass correction

1 **Enable reference mass correction.**

2 **Mark Bottle A to use the Agilent reference std.**

3 **Set the auto recalibration parameters.**

4 **Mark the masses that you want to use for the correction.**

The screenshot shows the 'Ref. Masses' tab in the software interface. At the top, there are tabs for Data, Acquisition, Ref. Masses, Chromatogram, Tune, Calibration, Parameters, and Diagnostics. Below the tabs, there are two main sections. The left section contains checkboxes for 'Enable Reference Mass Correction' and 'Use Bottle A'. Below these are 'Auto Recalibration Parameters' with input fields for 'Average' (11 scans), 'Detection Window' (50 ppm), and 'Minimum Height' (500 counts). The right section is titled 'Reference Masses' and contains a list of mass values with checkboxes next to them: 121.050873, 2121.933152, 322.048121, 622.028960, 922.009798, 1221.990637, 1521.971475, and 1821.952313. Below the list are 'Check All' and 'Check None' buttons. To the right of the 'Reference Masses' list are buttons for 'Select Masses...' and 'Edit Mass Lists...'.

If the list is blank or you want a different list for another standard, click the **Select Masses** button.

If you want to create a new mass list or modify the existing default lists, click **Edit Mass Lists**. See next page.

## Edit mass list

- 1 Select the default mass list for your ion source and polarity.

- 2 Enter a new name into the Name field.

Mass Lists

Name: Default

Save List

Delete List

Save As New List

Masses (m/z)

119.036320
119.036320
316.013789
655.991085
955.971923
1255.952761
1555.933600
1855.914438
2155.895277

Add

Modify

Delete

Polarity: Negative

Ion Source: APCI

Extended Name: APCI\_Neg\_Default

Close

- 3 Click Save As New List.

Mass Lists

Name: esdemo

Save List

Delete List

Save As New List

Masses (m/z)

119.036320
119.036320
316.013789
655.991085
955.971923
1255.952761
1555.933600
1855.914438
2155.895277

Add

Modify

Delete

Polarity: Negative

Ion Source: APCI

Extended Name: APCI\_Neg\_Default

Close

The Save As New List button appears when you enter a new Name.

All the other grayed out buttons appear when you click Save As New List.

- 4 Add or delete masses to the new list.

- 5 Click Save List.

Mass Lists

Name: New

Save List

Delete List

Save As New List

Masses (m/z)

119.036320
119.036320
316.013789
655.991085
955.971923
1255.952761
1555.933600
1855.914438
2155.895277

Add

Modify

Delete

Polarity: Negative

Ion Source: APCI

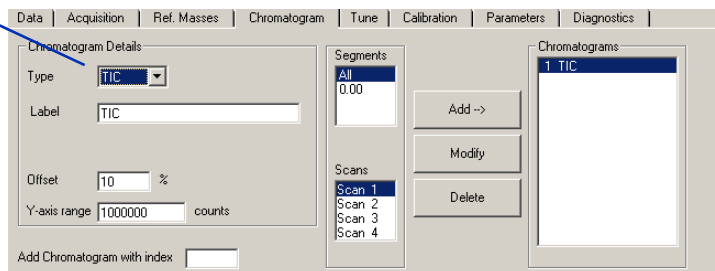
Extended Name: APCI\_Neg\_New

Close

## Set up signals for the real-time plot

Select the signal that you want to see in the real-time plot.

You can also select different time segments and scans to monitor.



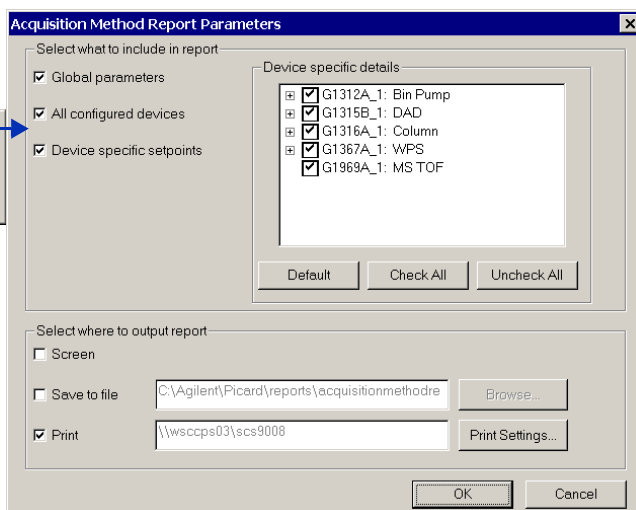
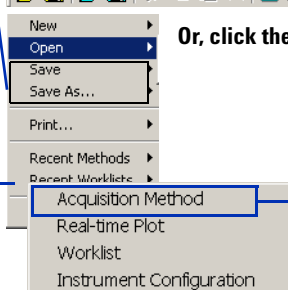
## Save and print the method

Select **Save** in the **File** menu to save the currently opened method, OR select **Save As** in the **File** menu to save a new method.

Select **Print > Acquisition Method** in the **File** menu to set up to print a method.



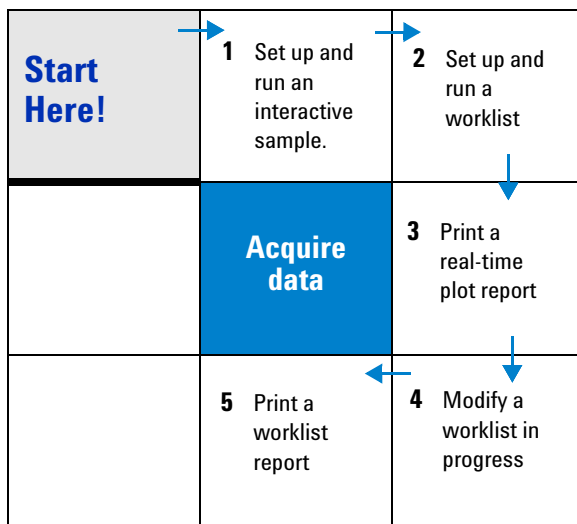
Or, click the Save icon for the method.



## Step 4—Acquire data

Read and follow the steps in the user information listed below to learn how to acquire data.

- The steps on the next pages that take you through the roadmap below.
- Chapter 4 of the *Concepts Guide*, Data Acquisition, to learn background information to help you acquire data.
- Chapters 3 and 4 of the *Familiarization Guide*
- *Online Help* for the tasks that correspond to the roadmap steps and the tasks listed on the next pages.



## Set up and run interactive samples

**1** Open a method using the menu item or the Combo bar.

**2** Click the Sample tab in the Method pane.

**3** Enter the sample name and custom variables.

**4** Select a project and enter the data file name.

**5** Select Acquisition Only.

**6** Click this Start to run interactive single samples.

You can only create projects in Analyst. See [“Step 5—Analyze data”](#) on page 35.

Even though Both Acquisition and DA is a selection in the “Part of method to run” list, it is not available for single samples in this version of software.

## Set up and run worklists (e.g., empirical formula confirmation)

1 Right-click here to bring up the worklist shortcut menu.

2 Select Add Multiple Samples to add a series of samples to the worklist.

3 Select Add column(s) to add a column for the empirical formula.

4 Enter the generic name (Formula\_x) and formula for an EFC column.



You must select **default.anm** to produce an empirical formula confirmation report.

You can also add batches of samples whose information and data you may want to keep together.

You can see an example of the resulting worklist on the next page.

You can also select Show/Hide columns to hide unnecessary columns.



This is an example of the resulting worklist.

	Sample Name	Sample Position	Acq Method	DA Method	Data File	Formula
	sulfa 1	P1-G6	eetest1.m	default.anm	sulfa001.wiff	C12H14N4O2S
2	sulfa 2	P1-G7	eetest1.m	default.anm	sulfa002.wiff	C9H10N4O2S2
3	sulfa 3	P1-H6	eetest1.m	default.anm	sulfa003.wiff	C10H9CIN4O2S
4	sulfa 4	P1-H7	eetest1.m	default.anm	sulfa004.wiff	C12H14N4O4S

Worklist

Click this Start to run a worklist.



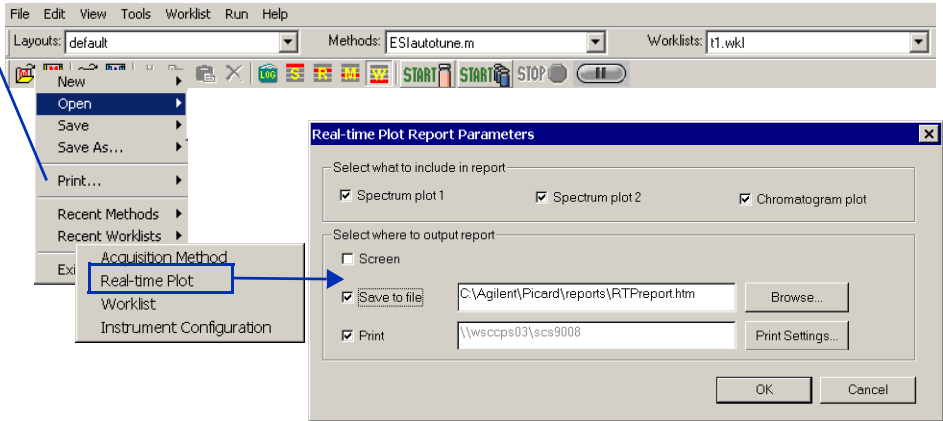
If Track Worklist is On (Worklist menu), the row that is running is highlighted blue.

	Sample Name	Sample Position	Acq Method	DA Method	Data File	Formula
1	sulfa 1	P1-G6	eetest1.m	default.anm	sulfa001.wiff	C12H14N4O2S
2>	sulfa 2	P1-G7	eetest1.m	default.anm	sulfa002.wiff	C9H10N4O2S2
3	sulfa 3	P1-H6	eetest1.m	default.anm	sulfa003.wiff	C10H9CIN4O2S
4	sulfa 4	P1-H7	eetest1.m	default.anm	sulfa004.wiff	C12H14N4O4S

Worklist

### Print a real-time plot report

- To print a real-time plot report during the run, select Print > Real-Time Plot.



## Modify the worklist in progress

You can modify any row below the row located under the running row (shaded blue).

If the last selected row is executing, then all rows are locked.

When you place the cursor on the row to be edited, tracking is automatically turned off. To turn tracking back on, you must check the worklist menu item, Track Worklist Run.

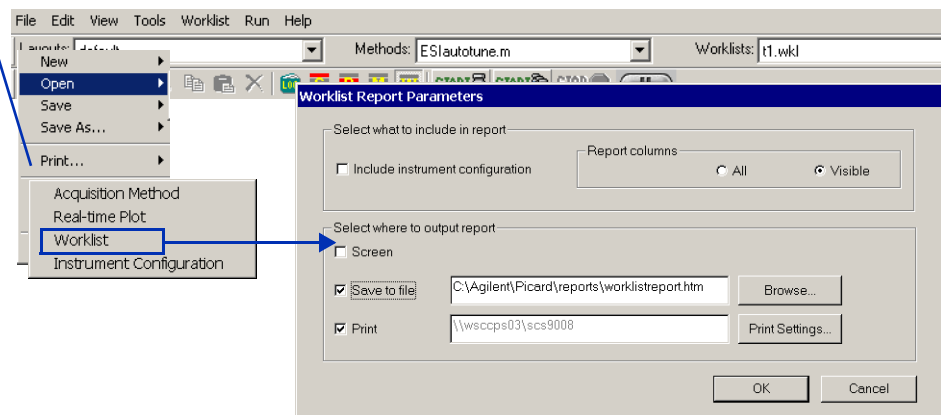
	Sample Name	Sample Position	Acq Method	DA Method	Data File	Sample Type	Inj Vol (µl)	Comment
1	eetest1	P1-A1	eetest1.m	default.anm	eetest1.wiff	Unknown	2	
2	eetest2	P1-A2	eetest2.m	default.anm	eetest2.wiff	Unknown	2	
3	eetest3	P1-B1	eetest3.m	default.anm	eetest3.wiff	Unknown	2	
4	eetest4	P1-B2	eetest1.m	default.anm	eetest4.wiff	Unknown	2	
5	eetest5	P1-C1	eetest2.m	default.anm	eetest5.wiff	Unknown	2	
6	eetest6	P1-C2	eetest3.m	default.anm	eetest6.wiff	Unknown	2	
7	eetest7	P1-D1	eetest1.m	default.anm	eetest7.wiff	Unknown	2	
8	eetest8	P1-D2	eetest2.m	default.anm	eetest8.wiff	Unknown	2	
9	eetest9	P1-E1	eetest3.m	default.anm	eetest9.wiff	Unknown	2	
10	eetest10	P1-F1	eetest1.m	default.anm	eetest10.wiff	Unknown	2	
11	eetest11	P1-G1	eetest2.m	default.anm	eetest11.wiff	Unknown	2	
12	eetest12	P1-H1	eetest3.m	default.anm	eetest12.wiff	Unknown	2	
13	eetest13	P1-A5	eetest1.m	default.anm	eetest13.wiff	Unknown	2	
14	eetest14	P1-A6	eetest2.m	default.anm	eetest14.wiff	Unknown	2	
15	eetest15	P1-A7	eetest3.m	default.anm	eetest15.wiff	Unknown	2	
16	eetest16	P1-B7	eetest1.m	default.anm	eetest16.wiff	Unknown	2	
17	eetest17	P1-B6	eetest2.m	default.anm	eetest17.wiff	Unknown	2	
18	eetest18	P1-B5	eetest3.m	default.anm	eetest18.wiff	Unknown	2	
19	eetest19	P1-C5	eetest1.m	default.anm	eetest19.wiff	Unknown	2	
20	eetest20	P1-C6	eetest2.m	default.anm	eetest20.wiff	Unknown	2	
21	eetest21	P1-C7	eetest3.m	default.anm	eetest21.wiff	Unknown	2	

	Sample Name	Sample Position	Acq Method	DA Method	Data File	Sample Type	Inj Vol (µl)	Comment
4	eetest4	P1-B2	eetest1.m	default.anm	eetest4.wiff	Unknown	2	
5	eetest5	P1-C1	eetest2.m	default.anm	eetest5.wiff	Unknown	2	
6	eetest6	P1-C2	eetest3.m	default.anm	eetest6.wiff	Unknown	2	
7	eetest7	P1-D1	eetest1.m	default.anm	eetest7.wiff	Unknown	2	
8	eetest8	P1-D2	eetest2.m	default.anm	eetest8.wiff	Unknown	2	
9	eetest9	P1-E1	eetest3.m	default.anm	eetest9.wiff	Unknown	2	
10	eetest10	P1-F1	eetest1.m	default.anm	eetest10.wiff	Unknown	2	
11	eetest11	P1-G1	eetest2.m	default.anm	eetest11.wiff	Unknown	2	
12	eetest12	P1-H1	eetest3.m	default.anm	eetest12.wiff	Unknown	2	
13	eetest13	P1-A5	eetest1.m	default.anm	eetest13.wiff	Unknown	2	
14	eetest14	P1-A6	eetest2.m	default.anm	eetest14.wiff	Unknown	2	
15	eetest15	P1-A7	eetest3.m	default.anm	eetest15.wiff	Unknown	2	

## Print the worklist

Select **Print > Worklist** to print the worklist report.

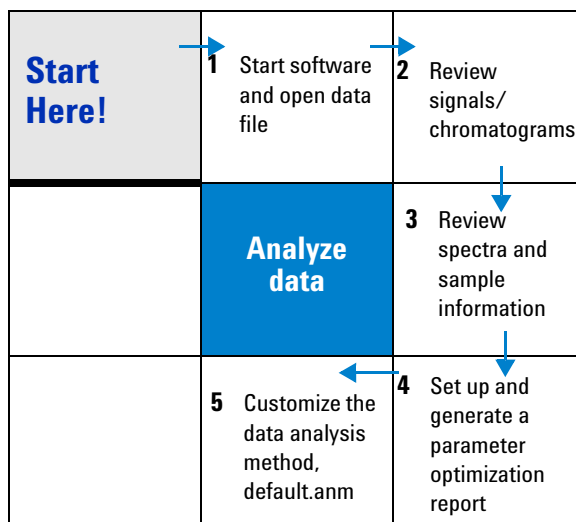


## Step 5—Analyze data

The primary tool for analyzing and reporting on results is PE-Sciex Analyst QS. PE-Sciex has modified their software specifically to accommodate the Agilent TOF system requirements.

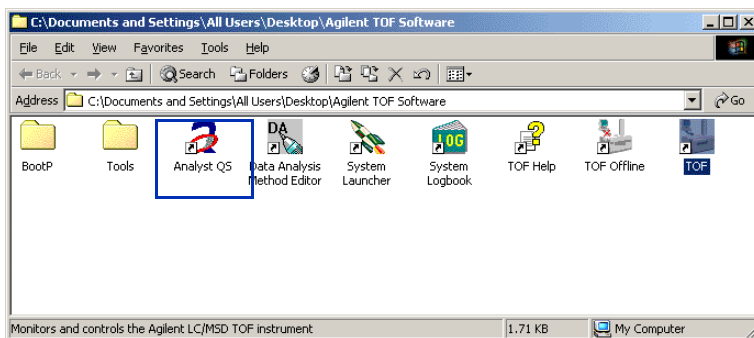
Read and follow the steps in the user information listed below to learn how to review TOF data and customize the data analysis method, default.anm, used to confirm empirical formulas.

- The steps on the next pages that take you through the roadmap below.
- Chapter 5 of the *Concepts Guide*, Data Analysis, to learn background information to help you analyze data.
- Chapters 3 and 4 of the *Familiarization Guide*
- *Online Help* for the tasks that correspond to the roadmap steps and the tasks listed on the next pages.
- Consult the *PE-Sciex Analyst User's Guide* and online help to learn how to perform other analysis operations not associated with the Agilent system.



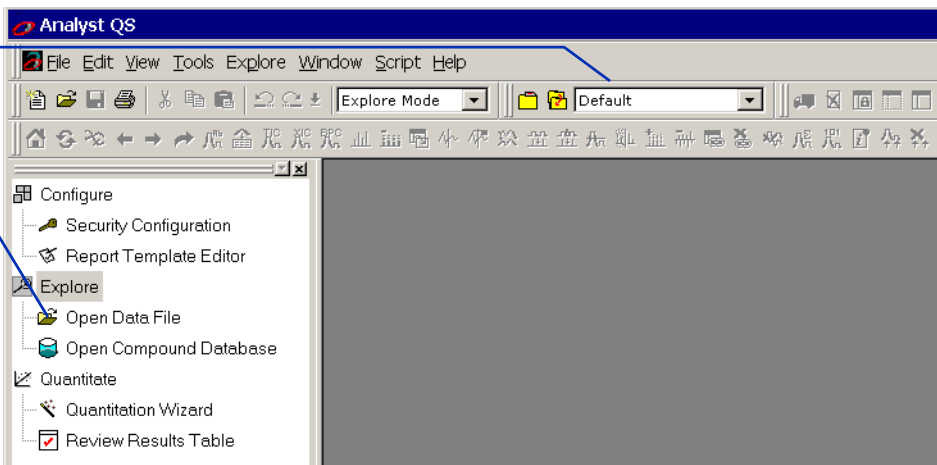
## Start the Analyst QS software and open a data file

- 1 Double-click the Analyst QS icon in the Agilent TOF Software group window.



- 2 Select the project that contains the data file.

- 3 Click to open .wiff files.



## Review signals/chromatograms

- 1 Right-click on chromatogram to bring up the shortcut menu.

- 2 Do any of the bulleted tasks on this page in any order that you want.

- Select List Data from the shortcut menu to see the results of integration.

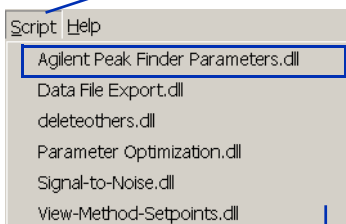
- Select Script > Agilent Peak Finder Parameters.dll to change integration parameters.

- Select Extract Ion from the shortcut menu to produce an XIC (EIC) chromatogram.

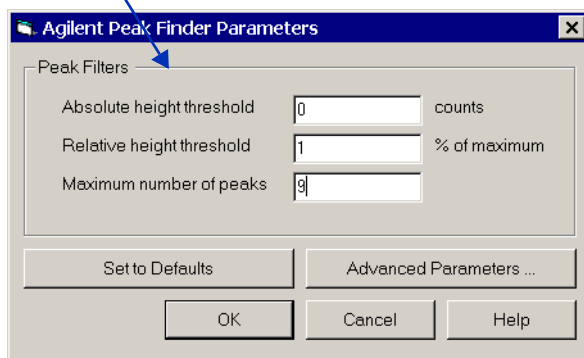
See the next page to learn about spectral operations with Analyst.

- Drag the cursor across a peak and select Show Spectrum from the shortcut menu to see the mass spectra in the peak

- To zoom into a peak, draw a rectangle under the peak baseline.



Method Setpoints by default are saved with the data file. Use the tool TOFSystemConfig to change whether Method Setpoints are saved. See the installation guide for more information.

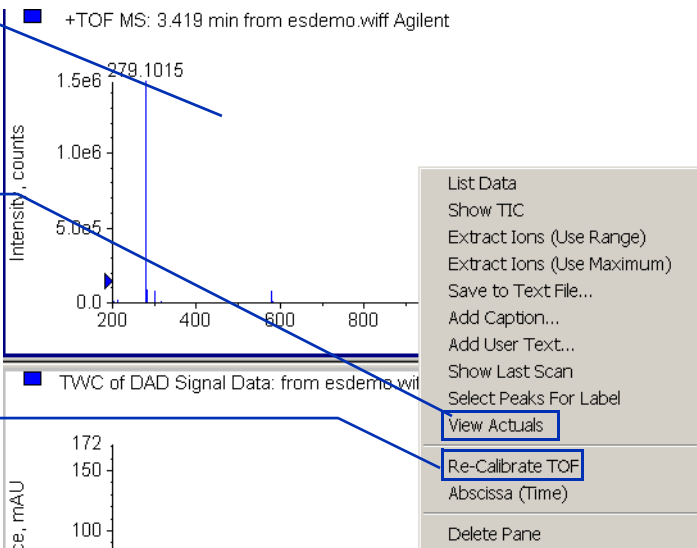


## Review spectra and sample information

- 1 Right-click on spectrum to bring up the shortcut menu.

- Select **View Actuals** from the shortcut menu to see the real-time TOF parameter values.

- Select **Re-Calibrate TOF** to recalibrate the TOF from Analyst.



- Click the sample information icon in the Analyst toolbar to view method and sample information on the data file.



The figure shows the Analyst software interface with the 'File Information' panel open. The panel displays information for 'Sample 1 (Test Sample) of esdemo.wiff'. The left sidebar shows a tree view with 'File Info' selected, containing 'Log Info', 'Column Oven', 'Acquisition Info', 'Agilent Mass Spectrometer', 'Quant Info', 'Period: 1', 'Resolution Tables', 'Calibration Tables', and 'Instrument Parameters'. The main panel displays the following information:

**File Information for Sample 1 (Test Sample) of esdemo.wiff**

Name: C:\PE Sciex Data\Projects\Default\Data\esd  
 Original Name: C:\PE Sciex Data\Projects\Default\Data\test  
 Software Version: Analyst QS

**Log Information:**

Column Oven Agilent 1100 G1316A 0  
 Left Column Tag Information  
 Not Available  
 Column Oven Agilent 1100 G1316A 0  
 Right Column Tag Information  
 Not Available

**Acquisition Info**

Acquisition Method: N/A  
 Acquisition Time: Monday, May 12, 2003, 11:30:29 AM  
 Duration: 0.000sec  
 Number Of Scans Acquired: 361  
 Periods In File: 1  
 Synchronization Mode: No Sync  
 Auto-Equilibration: Off

## Set up and generate a parameter optimization report

**1 Select Script > Parameter Optimization.dll in the Analyst main window.**

**2 Select the samples for the report.**

**3 Continue through the wizard, then click Finish.**

The 'Parameter Optimization' dialog box is titled 'Select the data file to use for the Parameter Optimization Report.' It contains two main sections:

**Available Data Files:**

- emetest1.wiff
- emetest2.wiff
- emetest3.wiff
- emetest4.wiff
- Enolase101702a\_5psig\_\_cvt.wiff
- esdemo.wiff
- fileNone.wiff
- sss3.wiff

**P.O. Samples for: C:\PE Sciex Data\Projects\Default\Data\sss3.wiff**

	Sample Name	Fragmentor	
<input checked="" type="checkbox"/>	s1	100	
<input checked="" type="checkbox"/>	s2	200	
<input checked="" type="checkbox"/>	s3	300	

Buttons: Next >, Cancel, Help

## Customize the data analysis method for empirical formula confirmation

- 1 Click the Data Analysis Editor icon in the TOF Software program folder.
- 2 Click the Formula Confirmation tab in the Data Analysis Method Editor window.
- 3 Enter values in the Formula Confirmation tabs to modify the default.anm method. Enter values in the Report Options tab to select which of the graphs to include. Enter values in the Screening tab to enable the database search.
- 4 Save the method.
- 5 Regenerate the report by rerunning the worklist in Data Analysis Only mode.

**Data Analysis Method Editor - C:\TOF Data\damethods\mfe2.anm**

File Edit Help

Properties | **Formula Confirmation** | Chromatogram | Spectrum | Target Mass | Screening | Sample Purity | Report Options

☐ Include sample purity results

Algorithms to use

☒ EIC/TIC percent area

☐ TIC percent area

☐ UV percent area

Delay time: 0 min

☐ ADC percent area

Delay time: 0 min

☒ Use largest MSD peak ☐ Use all MSD peaks

Noise threshold: 1 %

Calculation used for qualification: EIC/TIC percent area

Qualification level: 1 %

Positive excluded masses

Mass	Description

Insert Remove Validate

Negative excluded masses

Mass	Description

Insert Remove Validate

Properties | **Formula Confirmation** | Chromatogram | Spectrum | Target Mass | **Screening** | Report Options

☒ Use database for screening

Formula database: default.csv Browse...

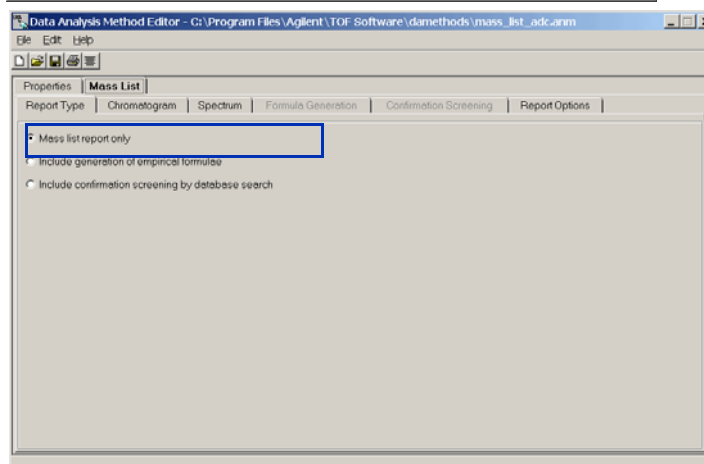
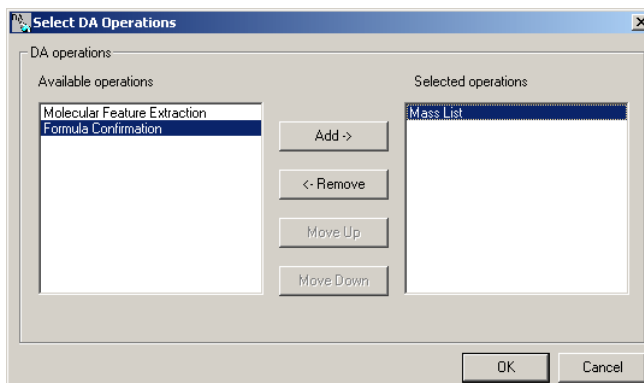
Retention time tolerance: -1 mins

The EFC report can now also include a backward database search (called an EFC Database Screening Report). Based upon a formula, a mass is determined and then XICs are extracted for that mass to see if the compound can be found. You can limit the search of the database to formulas with a certain retention time tolerance. A value of -1 in the Retention time tolerance field indicates to not limit the search based upon retention time.



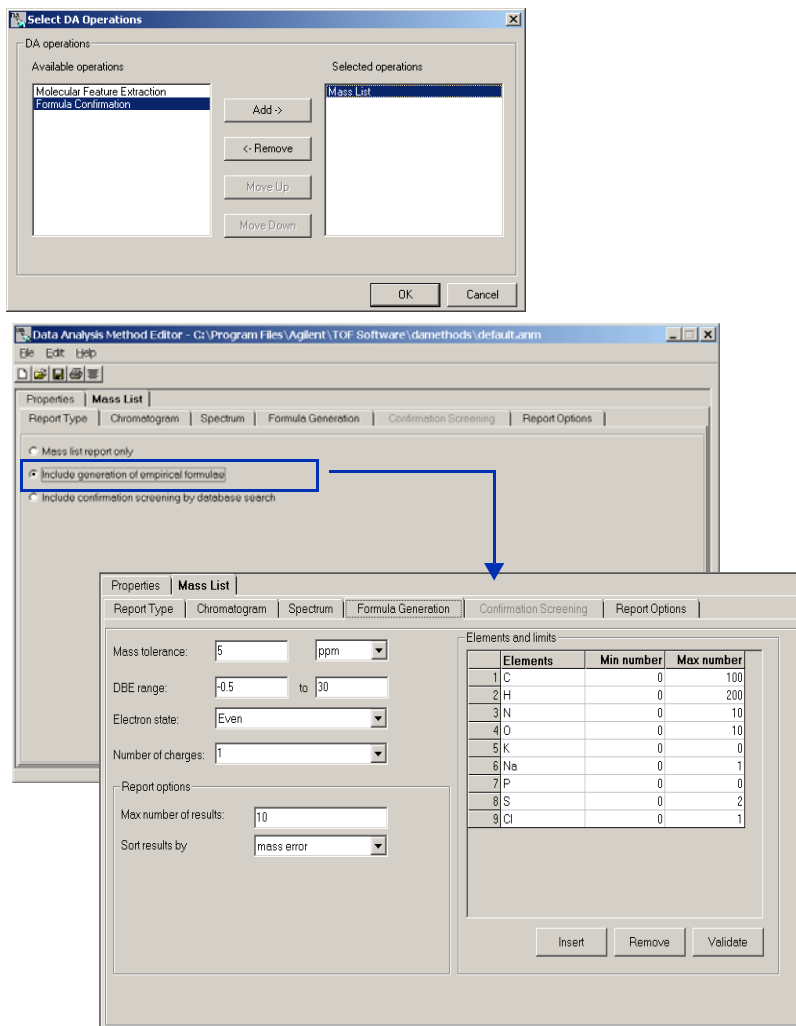
## Create a data analysis method for Mass List Report

- 1 Click the Data Analysis Editor icon in the Agilent TOF Software program folder.
- 2 Select Select DA Operations menu item from the Edit menu in the Data Analysis Method Editor window.
- 3 Click Mass List in the Available Operations list and click the Add button. If any other option appears in the Selected Operations list, click on it and click the Remove button.
- 4 Click OK to close the Select DA Operations dialog box.
- 5 Select the Report Type "Mass list report only".
- 6 Enter values in the Mass List tabs to modify the method.
- 7 Save the method with a new name, using the File>Save As menu item.
- 8 To generate a mass list report, create a worklist that specifies the data analysis method created in the steps above. The report will be generated for each sample when you run the worklist.



## Create a DA method for Mass List Report type Empirical Formula Generation

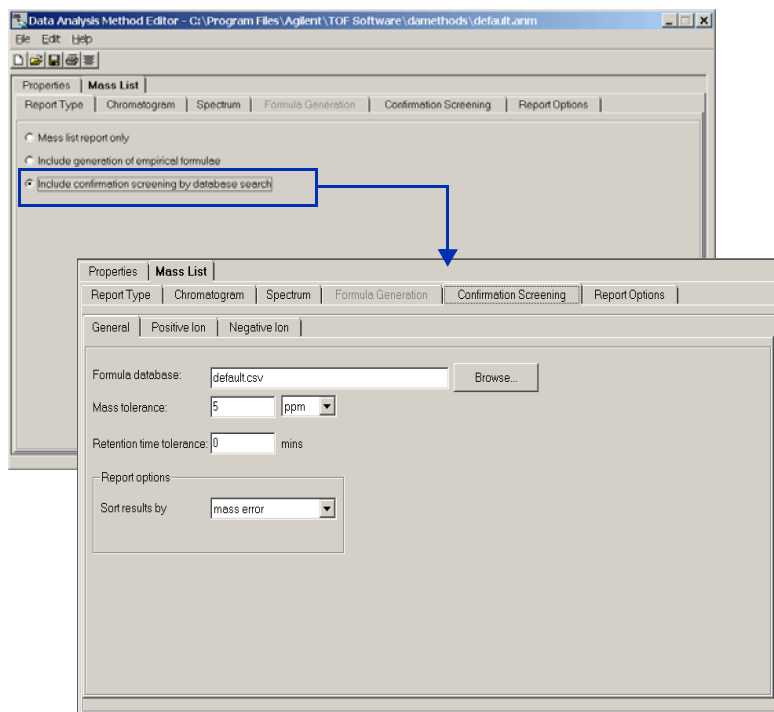
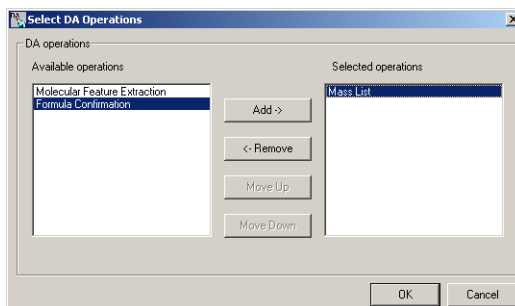
- 1 Click the Data Analysis Editor icon in the Agilent TOF Software program folder.
- 2 Select Select DA Operations menu item from the Edit menu in the Data Analysis Method Editor window.
- 3 Click Mass List in the Available Operations list and click the Add button. If any other option appears in the Selected Operations list, click on it and click the Remove button.
- 4 Click OK to close the Select DA Operations dialog box.
- 5 Select the Report Type "Include generation of empirical formulae".
- 6 Enter values in the Mass List tabs to modify the method including the "Formula Generation" tab.
- 7 Save the method with a new name, using the File>Save As menu item.
- 8 To generate a mass list report, create a worklist that specifies the data analysis method created in the steps above. The report will be generated for each sample when you run the worklist.



The Mass List Report including Empirical Formula Generation identifies valid molecular formulas that match the masses found in your sample based upon the values entered in this tab.

## Create a DA method for Mass List Report type Confirmation Screening

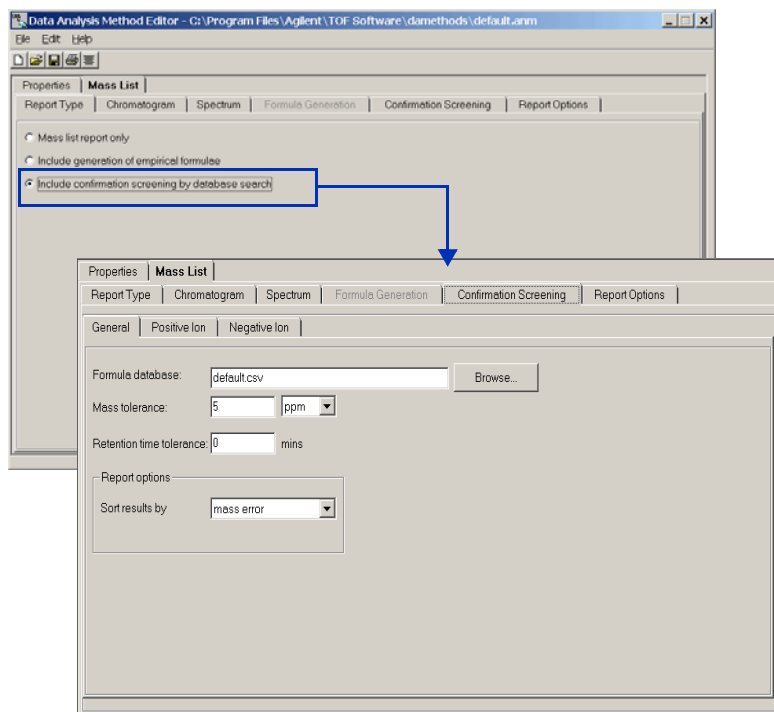
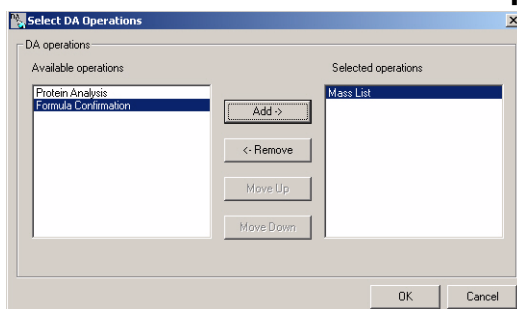
- 1 Click the Data Analysis Editor icon in the Agilent TOF Software program folder.
- 2 Select Select DA Operations item from the Edit menu in the Data Analysis Method Editor window.
- 3 Click Mass List in the Available Operations list and click the Add button. If any other option appears in the Selected Operations list, click on it and click the Remove button.
- 4 Click OK to close the Select DA Operations dialog box.
- 5 Select the Report Type "Include confirmation screening by database search".
- 6 Enter values in the Mass List tabs to modify the method including the "Confirmation Screening" tab.
- 7 Save the method with a new name, using the File>Save As menu item.
- 8 To generate a mass list report, create a worklist that specifies the data analysis method created in the steps above. The report will be generated for each sample when you run the worklist.



The Mass List Report including Confirmation Screening is a forward screening report. After determining the mass, the database is searched for formulas with the corresponding mass.

## Create a DA method for Molecular Features Extraction report

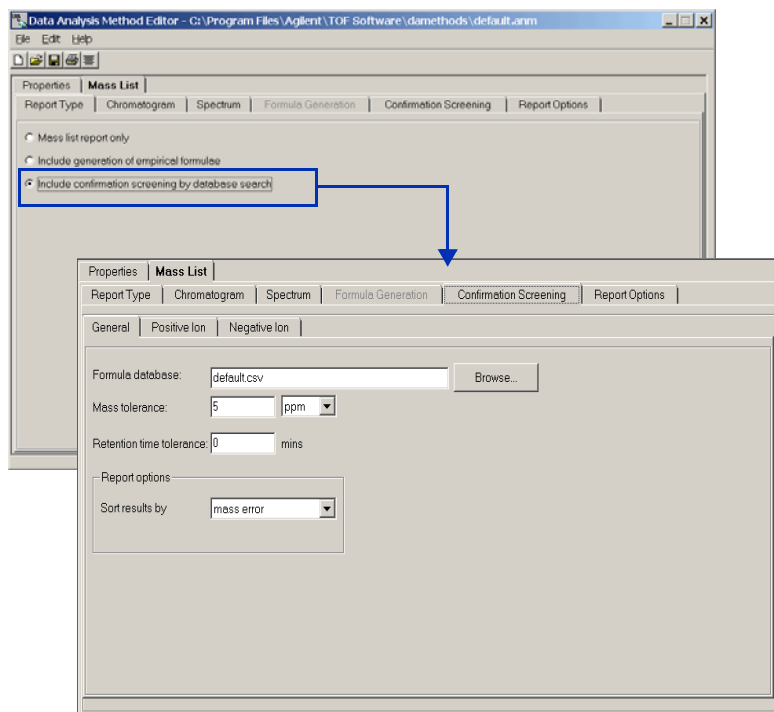
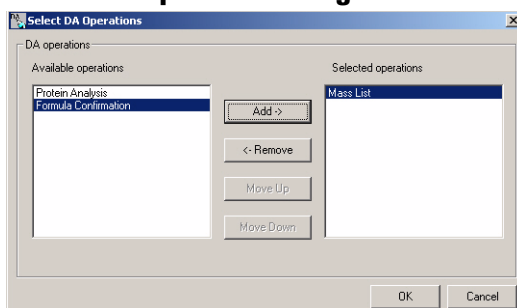
- 1 Click the Data Analysis Editor icon in the Agilent TOF Software program folder.
- 2 Select Select DA Operations item from the Edit menu in the Data Analysis Method Editor window.
- 3 Click Molecular Features Extraction in the Available Operations list and click the Add button. If any other option appears in the Selected Operations list, click on it and click the Remove button.
- 4 Click OK to close the Select DA Operations dialog box.
- 5 Select the Report Type "Molecular Feature Extraction only".
- 6 Enter values in the Molecular Feature Extraction tabs to modify the method.
- 7 Save the method with a new name, using the File>Save As menu item.
- 8 To generate a molecular feature extraction report, create a worklist that specifies the data analysis method created in the steps above. The report will be generated for each sample when you run the worklist.



The Molecular Feature Extraction Report lists out masses of chemical compounds and a list of isotopes of a compound found in the sample. The MFE report shows isotopes in the form of multiple isotope cluster based on adducts used in the ionization.

## Create a DA method for MFE Report including Confirmation Screening

- 1 Click the Data Analysis Editor icon in the Agilent TOF Software program folder.
- 2 Select Select DA Operations item from the Edit menu in the Data Analysis Method Editor window.
- 3 Click Molecular Feature Extraction in the Available Operations list and click the Add button. If any other option appears in the Selected Operations list, click on it and click the Remove button.
- 4 Click OK to close the Select DA Operations dialog box.
- 5 Select the Report Type "Include confirmation screening by database search".
- 6 Enter values in the MFE tabs to modify the method including the "Confirmation Screening" tab.
- 7 Save the method with a new name, using the File>Save As menu item.
- 8 To generate a mass list report, create a worklist that specifies the data analysis method created in the steps above. The report will be generated for each sample when you run the worklist.



The Molecular Feature Extraction Report including Confirmation Screening is a forward screening report. After determining the mass, the database is searched for formulas with the corresponding mass.





## **In this book**

This book contains brief instructions to help you get started with your Agilent 6210 Time-of-Flight TOF LC/MS system. This books shows you how to:

- Prepare the instrument for a run
- Set up acquisition methods
- Set up and run an interactive sample and worklists
- Review data

To submit comments about this guide, send an e-mail to [feedback\\_lcms@agilent.com](mailto:feedback_lcms@agilent.com).

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